Roll No	2	3	B	3	3	0	1	2	2

IET, Dr. Shakuntala Misra National Rehabilitation University, Lucknow
Applied Science and Humanities Department
Sessional Test- I (2023 - 24)

Sem &Year:2nd & 1st **Session: 2023-24**
Subject: Engineering Mathematics -II **Code: TBS-202**
Duration: 90 Minutes **Max. Marks: 20**

Part – A

Attempt all questions. **(4× 1 =4)**

1) Find the partial differential equation of this equation $z = f(x^2 - y^2)$
a) $pq = z$ b) $yp = xq$ c) $yp = -xq$ d) None of these

2) Which of the following represents the steady state behavior of heat flow
a) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ b) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = c^2$ c) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = c$ d) NOTA

3) Inverse Laplace transform of a function F(t) is $\frac{s}{s^2+4}$ then F(t) is
a) $\sin 2t$ b) $\sin h\ 2t$ c) $\cos 2t$ d) cos h 2t

4) $L\{u(t-2)\}$=…
a) e^{-2s}/s b) $e^{-2s}/2s$ c) e^{-2s}/s^2 d) $e^{-2s}/4s^2$

Part – B

Attempt any two questions. **(2×3=6 Marks)**

1.	Solve $r + 2s + t + 2p + 2q + z = 0$.
2.	Find the Laplace transform of $t^2 e^t cos4t$.
3.	Classify the PDE $t\frac{\partial^2 u}{\partial t^2} + 2\frac{\partial^2 u}{\partial x \partial t} + x\frac{\partial^2 u}{\partial x^2} + \frac{\partial u}{\partial x} = 0$.

Part – C

Attempt any two questions. **(2 x 5 = 10 Marks)**

1.	Solve the equation by using Laplace transform $\frac{d^3y}{dt^3} + 2\frac{d^2y}{dt^2} - \frac{dy}{dt} - 2y = 0$, where $y = 1, \frac{dy}{dt} = 2$, at $t = 0$.
2.	Using the method of separation of variables, solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$, where $u(x, 0) = 6e^{-3x}$.
3.	Solve $(D^3 - 3D^2D' - 4DD'^2 + 12D'^3)z = \sin(y + 2x)$